

a⁴ 16. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas is C₄F₈.

a⁵ 18. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas is C₂F₆.

19. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas is C₂ClF₅.

a⁶ 23. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas is C₃F₈.

REMARKS

At the outset, Applicants note that the pending claims of the present application were substantially copied from the claims of U.S. Patent Nos. 5,573,751 ("751 patent") and 5,409,688 ("688 patent") as part of a request for interference with the '751 and '688 patents. Since the '751 and '688 claims were held allowable and the pending claims of the present application have an earlier effective filing date than any of the '751 and '688 patent claims, the pending claims here should be deemed allowable like the '751 and '688 patent claims and an interference should be declared therebetween.

Claims 1-7, 9, 14, 16, 18, 19 and 23 are pending in this application. Claims 8, 10-13, 15, 17, 20-22 and 24-26 have been cancelled without prejudice.

Claims 12-26 were rejected under 35 U.S.C. § 112 as being indefinite because they used an "open" language. Applicants traverse and respectfully submit that these claims are definite. However, because this application was filed with a request for interference, without surrendering any subject matter or its equivalents and without any reason or concerns related to patentability, Applicants have amended pending claims 14, 16, 18, 19 and 23 for the sole purpose of

expediting prosecution by substituting "gas" for "freon" and "is" for "comprises". Thus, Applicants respectfully request that this rejection under 35 U.S.C. § 112 be withdrawn.

The Examiner stated that all of pending claims have an effective priority date of the instant application. Office Action, p. 5. Applicants respectfully traverse and submit that all of the pending claims have an effective filing date of April 2, 1990, the filing date of EP 90810262.7.

Additionally, in the Office Action, the Examiner has rejected claims 1-26 under 35 U.S.C. §§ 102(b,e) and 103 as being anticipated and/or obvious in view of U.S. Patent No. 5,558,856 ("Klaveness"), U.S. Patent No. 5,776,429 ("Unger I"), U.S. Patent No. 5,585,112, ("Unger II"), U.S. Patent No. 5,558,094 ("Quay I") and U.S. Patent No. 5,393,524 ("Quay II"). The Examiner also rejected claims 1-26 under 35 U.S.C. §§ 102(e) and 103 as being anticipated and/or obvious in view of U.S. Patent No. 5,716,597 ("Lohrmann"). Claims 1-26 were also rejected under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,730,954 ("Albayrak") and U.S. Patent No. 5,593,687 ("Rossling I"). Applicants respectfully traverse.

Furthermore, the Examiner rejected claims 1-26 under 35 U.S.C. § 103 as being unpatentable over U.S. Patent No. 5,501,863 ("Rössling II"); U.S. Patent No. 4,276,885 ("Tickner II"); U.S. Patent No. 4,265,251 ("Tickner I"); WO 90/12823 ("Illum"); U.S. Patent No. 5,730,954 ("Albayrak"); U.S. Patent No. 5,147,631 ("Glajch"); Swanson et al., "Enhancement Agents for Ultrasound Fundamentals," *Pharmaceuticals In Medical Imaging*, pp. 682-687 (1990) ("Swanson"); and U.S. Patent No. 4,466,442 ("Hillman") in view of Lincoff et al., "Intravitreal Longevity of Three Perfluorocarbon Gases," *Arch. Ophthalmology*, 98:1610-1611 (1980) ("Lincoff I"); Lincoff et al., "Invitreal Expansion of Perfluorocarbon Bubbles," *Arch. Ophthalmology*, 98:1646 (1980) ("Lincoff II"); Jacobs, "Intraocular Gas Measurement

Using A-Scan Ultrasound,” *Current Eye Research*, 5(8):575-578 (1986) (“Jacobs”); and “‘Freon’ Fluorocarbons: Properties and Applications” in DuPont Technical Bulletin G-1 (E.I. duPont de Nemours and Company, Wilmington, DE), pp. 1-10 (1987) (“DuPont”). Applicants respectfully traverse.

It is noted that thirteen references have been asserted as the basis of the Examiner’s last obviousness rejection. As the courts have stated, the fact that it is necessary to cite such a large number of references is, in and of itself, indicative of non-obviousness. *Minneapolis-Honeywell Regulator Company v. Midwestern Instruments, Inc.*, 298 F.2d 36, 38, 131 USPQ 402, 403 (7th Cir. 1961; *The Ric-Wil Company v. E.B. Kaiser Company*, 179 F.2d 401, 404, 84 USPQ 121,124 (7th Cir. 1950); *Reynolds et al. v. Whitin Machine Works*, 167 F.2d 78, 83, 76 USPQ 551, 555 (4th Cir. 1948); and *Racal-Vadic, Inc. v. Universal Data Systems*, 1980 U.S. Dist. LEXIS 15864, *81, 207 USPQ 902, 927 (N.D. Ala. 1980). Indeed, the inference that can be taken from the large reference citation is that no one reference is on point and that the Applicants have clearly accomplished what the prior art has repeatedly failed to do. *Minneapolis-Honeywell Regulator Company v. Midwestern Instruments, Inc.*, 298 F.2d 36, 38, 131 USPQ 402, 403 (7th Cir. 1961).

I. Effective Priority Date

The Examiner stated that all of the claims have an effective priority date of March 5, 1999. Office Action, p. 5. Applicants respectfully traverse. However, because this application contains a request for an interference, Applicants have amended the claims to narrow the issues so that the interference can be declared in a timely manner. Applicants respectfully submit that all of the pending claims have an effective filing date of April 2, 1990, the filing date of EP 90810262.7. Specifically, Applicants hereby address the Examiner’s conclusion on the effective filing date of the following elements:

1. The inventive concept of using CF₄, C₄F₈, C₂F₆, C₂ClF₅, and C₃F₈ was first disclosed in EP 90810262.7 by the term “freon” (i.e., ‘262.7, p. 8). It is well known that CF₄, C₄F₈, C₂F₆, C₂ClF₅, and C₃F₈ are freons. See e.g., “‘Freon’ Fluorocarbons: Properties and Applications” in DuPont Technical Bulletin G-1 (E.I. duPont de Nemours and Company, Wilmington, DE), pp.1-10 (1987).

2. The inventive concept of using CF₄, C₄F₈, C₂F₆, C₂ClF₅, and C₃F₈ with a surfactant was first disclosed in EP 90810262.7 by the terms “freon” (i.e., ‘262.7, p. 8) and “surfactants” (i.e., ‘262.7, p. 5 “suspension being stabilized by the presence of the surfactants...”, p. 8 “surfactants which are convenient in this invention...”).

3. The use of methods embraced by the term “contrast agent” was first disclosed in EP 90810262.7 (i.e., p. 1 “these compositions are mostly usable as contrast agents”).

All of the Examiner’s other comments are moot in light of Applicants’ amendments.

Thus, Applicants respectfully submit that the effective filing date of all of the pending claims in the instant application is April 2, 1990, the filing date of EP 90810262.7.

II. Schneider Claims 1-7, 9, 14, 16, 18, 19, and 23
Are Patentable Over Klaveness, Unger I, Unger II, Quay I and Quay II

The Examiner rejected claims 1-26 under 35 U.S.C. §§ 102(e) and 103 as being anticipated by and obvious over Klaveness, Unger I, Unger II, Quay I and Quay II. Applicants respectfully traverse.

A. Klaveness Is Not Prior Art
To Schneider Claims 1-7, 9, 14, 16, 18, 19, and 23

As explained above, each of the pending claims of the instant application has an effective priority date of April 2, 1990, the filing date of EP 90810262.7. Since Klaveness has a PCT publication date of July 22, 1993 and a 35 U.S.C. § 102(e) date of December 9, 1994, both of which are later than the effective filing date of the Applicants’ claims, Klaveness is not prior art

to the Applicants' claims. Thus, withdrawal of this rejection based on Klaveness is respectfully requested.

B. Unger I and Unger II Are
Not Prior Art To Schneider
Claims 1-7, 9, 14, 16, 18, 19, and 23

As stated above, each of the pending claims of the instant application has an effective priority date of April 2, 1990, the filing date of EP 90810262.7, which is prior to the earliest possible effective U.S. filing date of Unger I and Unger II. Applicants observe that both Unger I and Unger II mention some seven or more U.S. priority filing dates, most of which are continuation-in-part applications which continue to add new matter to each previous priority application. Yet the Examiner does not specify which of these dates is being relied upon in the Office Action. Applicants have determined that the earliest possible effective filing date under 35 U.S.C. 102(e) is April 30, 1993 for Unger I and November 30, 1993 for Unger II, and wish the Examiner to confirm this determination. Thus, withdrawal of this rejection based on Unger I and Unger II is respectfully requested.

C. Quay I and Quay II Are Not
Prior Art To Schneider
Claims 1-7, 9, 14, 16, 18, 19, and 23

As already discussed above, each of the pending claims of the instant application has an effective priority date of April 2, 1990, the filing date of EP 90810262.7. Thus, Quay I and Quay II, which have an earliest possible effective U.S. filing date of September 17, 1991, is not prior art to the Applicants' claims. Thus, withdrawal of this rejection based on Quay I and Quay II is respectfully requested.

D. Schneider Claims 1-7, 9, 14, 16, 18, 19, and 23 are
Nonobvious And Patentable Over Klaveness,
Unger I, Unger II, Quay I And Quay II

The Examiner rejected Schneider claims 1-67 over Klaveness, Unger I, Unger II, and Quay under 35 U.S.C. § 103. However, as explained above, neither Klaveness, Unger I, Unger II, Quay I nor Quay II are prior art to the Schneider claims since Klaveness, Unger I, Unger II, Quay I and Quay II all have earliest possible effective filing dates later than the April 2, 1990 effective filing date of Schneider's claims. Thus, withdrawal of this rejection in view of Klaveness, Unger I, Unger II, Quay I and Quay II is respectfully requested.

III. Schneider Claims 1-7, 9, 14, 16, 18, 19, and 23
Are Patentable Over Lohrmann

The Examiner rejected claims 1-26 under 35 U.S.C. §§ 102(e) and 103 as being anticipated by and obvious over Lohrmann. Applicants respectfully traverse.

As explained above, each of the pending claims of the instant application has an effective priority date of April 2, 1990, the filing date of EP 90810262.7. Since Lohrmann has an earliest possible effective filing date of June 4, 1993, which is later than the effective filing date of the Applicants' claims, Lohrmann is not prior art to the Applicants' claims. Thus, withdrawal of this rejection based on Lohrmann is respectfully requested.

IV. Schneider Claims 1-7, 9, 14, 16, 18, 19, and 23
Are Patentable Over Albayrak And Rossling I

The Examiner rejected claims 1-26 under 35 U.S.C. § 103 as unpatentable over Albayrak and Rossling I. Applicants respectfully traverse.

As discussed above, each of the pending claims of the instant application has an effective priority date of April 2, 1990, the filing date of EP 90810262.7. Thus, Albayrak, which has an earliest possible effective U.S. filing date of February 25, 1991 and Rössling, which has an earliest possible effective U.S. filing date of December 31, 1991, are not prior art to the

Applicants' claims. Thus, withdrawal of this rejection based on Albayrak and Rossling I is respectfully requested.

V. Schneider Claims 1-7, 9, 14, 16, 18, 19, and 23
Are Patentable Over Rossling II, Tickner I, Tickner II, Illum,
Albayrak, Glajch, Swanson, Hilmann In View Of
Lincoff I, Lincoff II, Gardner, Jacobs and Dupont

The Examiner rejected claims 1-26 under 35 U.S.C. § 103 as being unpatentable over Rossling II, Tickner I, Tickner II, Illum, Albayrak, Glajch, Swanson, Hilmann in view of Lincoff I, Lincoff II, Gardner, Jacobs and Dupont. Applicants respectfully traverse.

At the outset, as discussed above, each of the pending claims of the instant application has an effective priority date of April 2, 1990, the filing date of EP 90810262.7. Thus, since Albayrak (February 25, 1991), Rössling II (February 11, 1991), Illum (September 5, 1991), and Glajch (April 30, 1991) all have earliest possible effective filing dates after April 2, 1990, they are not prior art to those Schneider claims which have an effective priority date of April 2, 1990.

Additionally, as discussed below, none of these references, alone or in combination with another, provide all of the elements of the Applicants' claims:

A. Rossling II (U.S. Patent No. 5,501,863)

Rossling II discloses rigid particulate microparticles formed from aldehydes which may be porous and are often crystalline. Rossling II also discloses the use of undenatured albumin as a coupling agent to attach to the surface of the aldehydes used to make the microparticles.

B. Tickner I (U.S. Patent No. 4,276,885)

Tickner I discloses free gas microbubbles dispersed in gelatin membranes, which are warmed and dissolved in order to release free gas microbubbles. The gelatin acts as a viscosity barrier to reduce coalescence of the free gas microbubbles.

C. Tickner II (U.S. Patent No. 4,265,251)

Tickner II discloses saccharide microparticle precursors which dissolve in the bloodstream to release free gas microbubbles. These saccharide microparticles are porous, crystalline, rigid, and preferably grinded.

D. Illum (WO 90/12923)

Illum discloses multi-chambered hollow microcapsules. These microcapsules are rigid, particulate structures which may be porous and preferably have multiple gas-filled chambers.

E. Albayrak (U.S. Patent No. 5,730,954)

Albayrak discloses crystalline cavitate or clathrate forming host/guest complexes which dissolve to release free gas microbubbles. Albayrak also discloses the use of undenatured albumin and phosphatidylcholine in the liquid vehicle as viscosity or thickening agents which do not form a microbubble stabilized in part by surfactant.

F. Glajch (U.S. Patent No. 5,147,631)

Glajch discloses microparticles made of inorganic material. These microparticles are porous and may be crystalline.

G. Swanson

Swanson only mentions the use of liquid fluorocarbon as an agent which reacts to form bubbles.

H. Hilmann (U.S. Patent No. 4,466,442)

Hilmann discloses a solution containing a selected amount of tenside, viscosity raising compound and gas.

I. Lincoff I, Lincoff II, Gardner, Jacobs (collectively, the Ocular Documents)

Each of these Ocular Documents are directed to the use of a single large fluorinated gas bubble as intraocular tamponades for the treatment of retinal tears or detachments in the eye.

Specifically, these Ocular Documents discuss the desirability of free gas expansion within the eye - a property which teaches away from the use of fluorinated gas as ultrasound contrast agents since gas expansion in the bloodstream could lead to serious health effects (i.e., embolism) in the patient.

J. DuPont

While DuPont confirms that the term "freon" includes the gases of the Applicants' claims, there is no teaching or suggestion in this bulletin that freon gases may be used in an ultrasound contrast agent.

H. Applicant's Microbubbles

Rossling II, Tickner I, Tickner II, Illum, Albayrak, Glajch, Swanson, Hilmann, the Ocular Documents, and Dupont do not, individually or in combination, teach, suggest, or disclose the Applicants' microbubbles comprising a freon or an organic compound containing one or more atoms and fluorine wherein the microbubbles are stabilized in part by a surfactant.

Thus, as there is no teaching anywhere in any of the above cited references of the elements of the Applicants' claims, withdrawal of this rejection based on Rossling II, Tickner I, Tickner II, Illum, Albayrak, Glajch, Swanson, Hilmann in view of Lincoff I, Lincoff II, Gardner, Jacobs and Dupont is respectfully requested.

Therefore, as these pending claims 1-7, 9, 14, 16, 18, 19, and 23 are fully supported in the specification and are fully patentable over any references cited, favorable action on these claims is requested. In view of the foregoing, Applicants respectfully request that the rejections of these claims be withdrawn and all pending claims allowed.

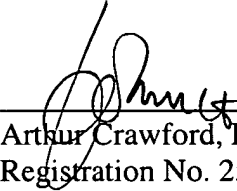
VI. Response To Obviousness-Type Double Patenting
And Provisional Obviousness-Type Rejections

Page 12 of the Office Action contains two rejections, the first alleging obviousness-type double patenting rejections over a listing of some 16 U.S. patents and the second alleging obviousness-type double patenting over a host of pending patent applications. No "conflicting claims" were specified so it is difficult if not impossible to determine which of the patents and patent applications are of concern. With the claims amended, Applicants respectfully submit this issue is now moot. In any event, counsel will hold these issues in abeyance until claims are indicated to be otherwise allowable in this application.

If there are any further points requiring attention prior to allowance, the Examiner is asked to contact Applicant's counsel.

No fee is required. If there are additional fees, please charge them to our firm Deposit Account No. 14-1140.

Respectfully submitted,


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Attorney Docket No.: 1201-71

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of: Schneider, et al.

Serial No.: 09/266,889

Filed: March 12, 1999

For: Ultrasound Contrast Agents And
Methods Of Making And Using Them

Art Unit: 1619

Examiner: M. Hartley

Assistant Commissioner of Patents
Washington, DC 20231

March 16, 2001

37 C.F.R. § 1.121(c)(2)(ii)
MARKED UP VERSION OF
CLAIMS 1, 2, 7, 9, 14, 16, 18, 19, AND 23

Sir:

Pursuant to revised 37 C.F.R. § 1.121(c)(2)(ii), Applicants hereby submit a marked up version of the amended claims 1, 2, 7, 9, 14, 16, 18, 19, and 23 to show the changes made relative to the previous version of those claims:

CLAIMS

1. (Amended) A contrast agent comprising stabilized microbubbles, said stabilized microbubbles comprising a physiologically acceptable gas that is a freon [selected from the group consisting of freons, halogenated hydrocarbons, and fluorinated gases], said stabilized microbubbles being stabilized, at least in part, by a surfactant.

2. (Amended) A contrast agent comprising stabilized microbubbles, said stabilized microbubbles comprising a physiologically acceptable gas that is [a freon] an organic compound containing one or more carbon atoms and fluorine, said stabilized microbubbles being stabilized, at least in part, by a surfactant.

7. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas [freon] is selected from the group consisting of CF₄, [CBrF₃,] C₄F₈, [CClF₃,] C₂F₆, C₃F₈[, C₄F₆], and C₂ClF₅[, CBrClF₂, C₂Cl₂F₄, C₅F₁₀, C₅F₁₂, and C₄F₁₀].

9. (Amended) The contrast agent of claim 2, wherein the physiologically acceptable[freon] gas is selected from the group consisting of CF₄, [CBrF₃,] C₄F₈, [CClF₃,] C₂F₆, C₃F₈[, C₄F₆], and C₂ClF₅[, CBrClF₂, C₂Cl₂F₄, C₅F₁₀, C₅F₁₂, and C₄F₁₀].

14. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas [freon comprises] is CF₄.

16. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas [freon comprises] is C₄F₈.

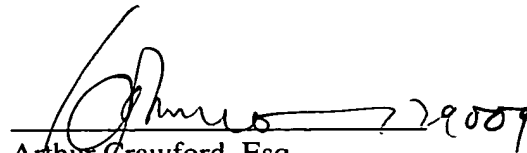
18. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas [freon comprises] is C₂F₆.

19. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas [freon comprises] is C₂ClF₅.

23. (Amended) The contrast agent of claim 1 wherein the physiologically acceptable gas [freon comprises] is C₃F₈.

Kindly cancel claims 8, 10-13, 15, 17, 20-22, and 24-26 without prejudice.

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